

## ABSTRACT

A nanosphere having a diameter of less than 300 nanometers is provided having at least a single domain magnetically responsive nanoparticle contained within a bio-compatible shell. In a preferred embodiment the nanosphere has a bio-compatible shell made of collagen encapsulating a plurality of superparamagnetic nanoparticles. The nanoparticles have a diameter of less than 10 nanometers. The nanoparticles are contained within the bio-compatible shell and may be synthesized in a method whereby a magnetic metal salt is vaporized and then quenched. Quenching of the vaporized magnetic metal salt controls the size of the nanoparticles so that a generally uniform diameter is achieved. Alternatively, the nanoparticles may be formed by preparing a solution of magnetic metal salt and alkaline media to form a precipitate. The resulting precipitate is processed to remove the nanoparticles. A solution of the magnetically responsive nanoparticles and sodium silicate is prepared, atomized and dried in a magnetic field to form the nanospheres. The resulting nanospheres have a bio-compatible shell that encapsulates uniformly aligned single domain nanoparticles.

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